Treatment persistence and cost-effectiveness of latanoprost/latanoprost-timolol, bimatoprost/bimatoprost-timolol, and travoprost/travoprost-timolol in glaucoma: an analysis based on the United Kingdom general practitioner research database

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the cost-effectiveness of three sequences of first-line and second-line treatment for patients with primary open-angle glaucoma, considering persistence with treatment. Based on UK general practitioner data, travoprost then travoprost and timolol had longer treatment persistence, at lower costs, than latanoprost then latanoprost and timolol, and bimatoprost then bimatoprost and timolol, and it was cost-effective. The analysis had a simple framework that reported the real-world economic and clinical impact of the treatments. The authors’ conclusions seem valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of three sequences of first-line and second-line treatment for patients with primary open-angle glaucoma. The data were from one database and persistence with treatment was considered.

Interventions
The three treatment sequences were latanoprost then latanoprost and timolol; bimatoprost then bimatoprost and timolol; and travoprost then travoprost and timolol.

Location/setting
UK/primary care.

Methods
Analytical approach:
The analysis was based on a single study, with a minimum follow-up of six months and a maximum of over five years. The analysis had a three-year time horizon. The authors stated that it was carried out from the perspective of the UK NHS.

Effectiveness data:
The clinical data were from the United Kingdom General Practitioner Research Database (UK-GPRD), which collected information from a representative sample of general practitioners (GPs). Extensive data management was required to extrapolate the clinical data from this database. Some assumptions were made. A total of 1,816 patients were identified in this database, with 1,592 receiving latanoprost, 110 receiving bimatoprost, and 114 receiving travoprost. The mean age of the whole sample was 68 years with a gender ratio of approximately one male to one female. The key input was the treatment failure, which was defined as a prescription change or patients undergoing laser therapy or surgery. Linear regression was used to identify potential confounders.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The two key endpoints of the clinical analysis were the treatment persistence at 36 months and the failure rate.
Cost data:
The economic analysis included the costs of laser or surgical treatments, hospitalisation, medications, medical visits to specialists and GPs, and prescription renewals by telephone. The resource use data were from the UK-GPRD. The drug costs were from the British National Formulary and they did not include drug discounts. Laser therapy and surgery were valued, using tariffs from the Department of Health. Other costs were from two Personal Social Services Research Unit reports. All costs were in UK pounds sterling (£) and the price year was 2008. A comparison of economic data was carried out, using linear regression.

Analysis of uncertainty:
Not performed.

Results
The persistence with treatment at 36 months was 60% with latanoprost, 55.5% with bimatoprost, and 70.3% with travoprost.

The rate of treatment failure was 51.6% with latanoprost, 30.0% with bimatoprost, and 25.4% with travoprost.

The adjusted monthly costs were £22.46 with latanoprost, £20.64 with bimatoprost, and £17.21 with travoprost.

All differences were statistically significant.

Authors' conclusions
The authors concluded that, based on UK GP data, travoprost then travoprost and timolol had longer treatment persistence, at lower costs, than the latanoprost and bimatoprost sequences, and it was cost-effective.

CRD commentary
Interventions:
The authors justified their selection of treatment sequences. A new British recommendation on primary open-angle glaucoma treatment was to offer patients a prostaglandin analogue, making monotherapy the first-line treatment, followed by fixed combination therapy of the prostaglandin analogue with timolol, after initial treatment failure.

Effectiveness/benefits:
The authors justified their use of clinical data from a physicians' database, which offered real-world estimates of treatment efficacy, which should be useful for making health decisions. This administrative source required extensive extrapolation of data for the cost-effectiveness analysis. The authors acknowledged that a clinical trial would have provided higher internal validity, but stated would have been less representative of the real clinical situation. They performed statistical analyses to account for potential confounders and differences in the length of follow-up between treatment groups. These groups were well balanced at baseline in their clinical and demographic features, but the size of the groups was not balanced and power calculations were not carried out to ensure the significance of the comparison. The endpoints of the analysis were the direct outcomes of the glaucoma treatments and these cannot be compared with other disease outcomes.

Costs:
The categories of costs reflected the perspective of the UK NHS as stated by the authors. The resource use was from the UK-GPRD, which should ensure that the data were detailed and representative of real life. The unit costs were from appropriate standard UK sources, but they were not presented separately from the resource quantities. No sensitivity analysis of the costs was conducted. These issues limit the ability to transfer and reproduce the analysis. The total costs were presented for subgroups of items that allowed the consideration of the relative impact of each category of cost. No discounting was applied and the costs might have occurred in different time periods over the three years.

Analysis and results:
The results were clearly presented. A synthesis of the costs and benefits was not performed as the analysis had a cost-consequences framework. The uncertainty was not investigated as the authors used real-world data that reflected the actual clinical and economic impact of treatments. Statistical analyses were carried out to consider the impact of
confounders on both the costs and efficacy data. The generalisability of the results was not discussed and the findings should be considered to be specific to the UK.

Concluding remarks:
The analysis had a simple framework that reported the real-world economic and clinical impact of the three treatments. The authors’ conclusions appear to be valid.

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